

DETAILED ACTION

Application Status

In response to a previous Office action, a non-final requirement (mailed on April 04, 2008), Applicants filed an amendment on June 02, 2008, amending claims 1, 30-35 and 40 is acknowledged.

Claims 2-29 and 43-44 remain canceled.

Claims 1, 30-42 and 45 are under consideration and are present for examination.

The abstract has been rewritten on a separate sheet attached herewith as required by 37 CFR 1.72 (b).

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John Stolpa, the representative of the instant application on 10/14/2008.

Amend specification as follows:

Insert, as the first sentence of the specification, the following.

This application is a 371 US filing of PCT/US04/11830 filed on 04/16/2004, which claims benefit of US provisional application 60/464,081 filed on 04/18/2003.

Amend claims as follows:

Replace Claim 1 with "1. A *Chlamydomonas reinhardtii* oxygen-sensitive iron hydrogenase variant which is mutated by substitution of one or more identified amino acid residues within a hydrogen channel of the oxygen-sensitive iron hydrogenase, wherein the one or more identified amino acid residues are independently substituted with an amino acid selected from the group consisting of tryptophan, isoleucine, leucine and phenylalanine, having properties that limit O₂ diffusion through the channel while allowing H₂ diffusion out of the channel, and wherein the substituted amino acid reduces the diameter of the channel, wherein the variant hydrogenase is an oxygen-resistant iron hydrogenase".

Claim 41, line 1, replace "claim 40" with "claim 1".

Claim 42, line 1, replace "claim 40" with "claim 1".

Cancel claims 33, 35-40 and 45.

Allowable Subject Matter

Claims 1, 30-32, 34 and 41-42 are allowed.

Reasons for Allowance

The following is an examiner's statement of reasons for allowance: The applicant has claimed a *Chlamydomonas reinhardtii* oxygen-sensitive iron hydrogenase is mutated by substitution of one or more identified amino acid residues within a hydrogen

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channel of the oxygen-sensitive iron hydrogenase, wherein the one or more identified amino acid residues are independently substituted with a naturally occurring or synthetic amino acid selected from the group consisting of tryptophan, isoleucine, leucine, and phenylalanine, having properties that limit O_2 diffusion through the channel while allowing H_2 diffusion out of the channel, and wherein the substituted amino acid reduces the diameter of the channel, wherein the hydrogenase is oxygen-resistant iron hydrogenase. . A standard search did not produce any prior art that suggests or teaches the claimed invention. The claimed invention is novel and nonobvious over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Iqbal Chowdhury, Ph.D. whose telephone number is (571) 272-8137. The examiner can normally be reached on Monday-Friday from 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nashaat T. Nashed, can be reached at (571) 272-0934.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Examiner, Art Unit 1652

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/Rebecca E. Prouty/

Primary Examiner,

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Abstract:

The invention provides oxygen- resistant iron-hydrogenases ([Fe]-hydrogenases) for use in the production of H₂. Methods used in the design and engineering of the oxygen-resistant [Fe]-hydrogenases are disclosed, as are the methods of transforming and culturing appropriate host cells with the oxygen-resistant [Fe]-hydrogenases. Finally, the invention provides methods for utilizing the transformed, oxygen insensitive, host cells in the bulk production of H₂ in a light catalyzed reaction having water as the reactant.